Bulletin of the Mineralogical Society of Southern California

Volume 94 Number 4 - April, 2021

The 988th meeting of the Mineralogical Society of Southern California

With Knowledge Comes Appreciation

A ZOOM Meeting

April 9th, 2021 at 7:30 P.M.

Program: **The Lithium "Gold Rush": Presented by Aaron Celestian NHM**

In this Issue:

Remember: If you change your email or street address, you must let the MSSC Editor and Membership Chair know or we cannot guarantee receipt of future Bulletins

About the Program: The Lithium "Gold Rush": Presented by Dr. Aaron Celestian:
Curator, Mineral Sciences at Los Angeles Natural History Museum

I haven't given this talk on this subject before, so I'm not exactly sure what the main focus will end up being. It should be pretty interesting though! The talk will have plenty of mineral photos (from pegmatites to salars), uses of the metal, a brief history of lithium extraction, and new research directions. I'm working on several lithium projects at the moment.

Dr. Celestian's current research is how minerals interact with their environments and with living things, and how those minerals can be used to solve problems like climate change, pollution, and disease. His on-going research in experimental design, real-time material characterization, mineral discovery & application, and the functionalization of minerals is developing novel nano-crystalline Earth materials into functional materials for a wide variety of demanding applications. Dr. Celestian holds adjunct teaching and research faculty positions at the University of Southern California and is an Affiliate Research Scientist at NASA's Jet Propulsion Laboratory. In addition to research, Dr. Celestian oversees the Gem & Mineral Hall at the Natural History Museum of Los Angeles and develops mineral science exhibits.

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From the Editor: Linda Elsnau

Tax time, Easter, Earth Day! How did we get here so fast? These are interesting times; due to current isolation issues, time can really seem to drag by, then you look at the calandar.and it's already April!

Looks like we have another interesting program this month. I'm certain we appreciate all the hard work our Program Chair is putting into this job. Thanks for all your hard work Rudy!

If you haven't already done so, please get your Covid vaccinations and stay safe and healthy.

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FROM THE PRESIDENT: Interesting Minerals, A to Z. Round 2, Installment 13, the letter "M": by George Rossman

Milarite $KCa_2AlBe_2Si_{12}O_{60}.nH_2O$

The type locality for milarite is the Giuv Valley, Tujetsch, Surselva Region, Grisons, Switzerland. It was first described by A. Kenngott in 1870. As such the name is grandfathered by the International Mineralogical Association.

> Kenngott, A. (1870) Mittheilungen and Professor G. Leonhard. Neues Jahrbuch für Mineralogie, Geologie und Paläontologie: 1870: 80-81.

So, why the name milarite rather than something like "giuvite" after the locality? It appears that Kenngott made a mistake when he originally attributed the locality of the phase he described to the Val Milà, Grishun, Switzerland. Oops! It wasn't from there. It was from Giuv Valley, a bit to the west.

Oh well; the name remains milarite, not to be confused with the mineral species millerite, the nickel sulfide [NiS].

The actual chemical composition of milarite was not established until the work of Charles Palache at Harvard University who determined that beryllium was a major component of the phase, ideally $KCa_2AlBe_2Si_{12}O_{60}$ with a variable amount of water in the structure.

> Palache C (1931) On the presence of beryllium in milarite. American Mineralogist: 16: 469-470.

We will come back to that water later. If milarite had exactly the ideal formula, it would be colorless, and often it is **(Figures 1,2).**

Figure 1. Colorless milarite from the Middle Moat Mountain from Carroll Co., New Hampshire, USA
Photo Credit: Rob Lavinsky and iRocks.com

Figure 2. Colorless milarite from the type locality region, Grisons, Switzerland.
Photo Credit: Rob Lavinsky and iRocks.com

Figure 3, Yellow milarite from the Rössing Mountains Area, Namibia
Photo Credit: Rob Lavinsky & irocks.com

Figure 4. Yellow milarite from the Rössing Mountains Area, Namibia.
Photo Credit: Rock Currier

Figure 5. Pale greenish-yellow milarite from Jaguaraçu, MG, Brazil.
Photo Credit: Rob Lavinsky and irocks.com

Figure 6. Milarite from the Valenciana Mine, Guanajuato, Mexico.
Photo Credit: Rob Lavinsky and irocks.com

While milarite can be colorless, frequently, it commonly has some iron in it. Furthermore, yttrium and rare earth elements can also be significant components in milarite. These combined often lead to a yellow color **(Figures 3,4).**

Milarite is a hexagonal mineral. The hexagonal shape can be seen in the pictures of the crystals from Jaguaraçu **(Figure 5)** and Guanajuato **(Figure 6).**

Milarite can be easily confused with beryl or apatite because of their similar visual appearances and colors.

An interesting aspect of the structure of milarite is the double rings of tetrahedra. They are aligned to form channels that run down the c-axis of the crystal **(Figures 7,8).** Hawthorne et al. (1991) showed that the water resides in the open channels formed by the silicate rings. Because it occupies a 'vacant' space in the channel, water is not an essential structural component, and can vary in the amount contained from sample to sample. The ater content of milarite is, in fact, variable, typically ranging from 1 to 2 percent by weight.

Hawthorne FC, Kimata M, Černý P, Ball N, Rossman GR, Grice JD (1991) The crystal chemistry of the milarite-group minerals. American Mineralogist 76, 1836-1856.

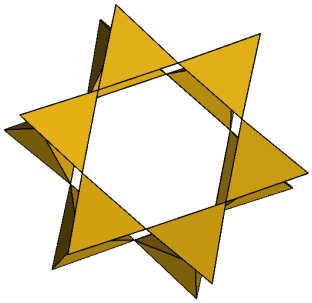

Figure 7. The double tetrahedral ring of milarite looking nearly down the c-axis

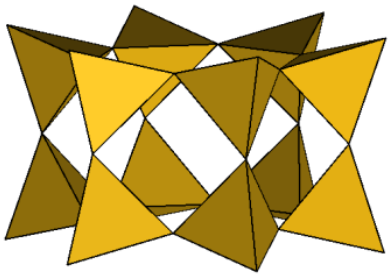

Figure 8. The double tetrahedral ring of milarite looking nearly perpendicular to the c-axis

There are eighteen other minerals with double ring tetrahedral structures including osumilite [$KMg_2Al_3(Al_2Si_{10})O_{30}$], sugilite [$KNa_2Fe^{3+}{}_2(Li_3Si_{12})O_{30}$] , and poudretteite [$KNa_2(B_3Si_{12})O_{30}$] (Figures 9,10,11). Together, they constitute the osumilite group of minerals. Previously, I wrote about osumilite in the March, 2019, MSSC bulletin. These other ring silicates which are members of the osumilite group often also have water molecules in their channels, but occasionally, some do not.

Milarite forms at comparatively low temperatures, crystalizing in the range of 200-250 ºC at relatively low pressures. It is found in vugs in plutonic rocks, in pegmatites, in alpine veins, and in hydrothermal ore deposits. There are no commercial uses for the mineral other than as an item for hobbyists to collect.

So, go collect some.

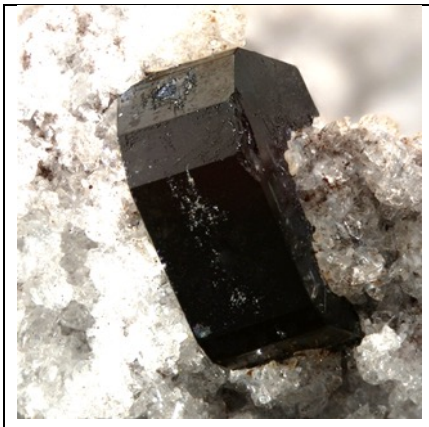

Figure 9. Osumilite from the Funtanafigu Quarry, Sardinia, Italy
Photo Credit: rruff.info.org

Figure 10. Sugilite from the Wessels Mine, Hotazel, South Africa. Photo Credit: Rob Lavisnky & irocks.com

Figure 11. Poudretteite from Mogok Township, Myanmar. Photo Credit: grr

With Knowledge Comes Appreciation!

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MINUTES of the March 13 2019, General Meeting

At 7:32 p.m., the **987th Membership Meeting** of the Mineralogical Society of Southern California (MSSC) was called to order by President Dr. Rossman, Ph.D. It was MSSC's 10th ZOOM conference meeting due to the ongoing Coronavirus (COVID-19) pandemic. We thank Caltech for their generous allowance in sharing their licensing with us.

Message from the Chair (Dr. Rossman):

Dr. Rossman welcomed one and all to the meeting. He reports that the International Mineralogical Association's (IMA) has approved 5,688 minerals as of March 11, 2021, of which Tony Kampf, MSSC member and with us tonight, was responsible for 5 of the newly approved new mineral species!

A couple of those also recently approved minerals include *xuite,* a member of the Garnet Supergroup and *zolenskyite,* an iron-chromium-sulfur found in a meteorite in Azerbaijan.

Regular Business (Dr. Rossman)

Minutes: Dr. Rossman called for a motion to approve the February 2021 Membership Meeting Minutes as published in the March 2021 *Bulletin.* Dr. George asked if there were any corrections or additions and hearing none, called for a motion to approve. A motion to approve the stated minutes was made by Carolyn Seitz and seconded by Cheryl Lopez. The vote was called and **the motion to approve the minutes passed unanimously**. Dr. Rossman declared the Minutes approved.

Announcements and Reports

(1) Program Chair Rudy Lopez: the ZOOM meeting invitation list will change effective with the April 2021 membership meeting. The e-mail invite list will be cleared on March 23, 2021. If, however, you are already a MSSC member, you will automatically be put back on the e-mail invitation list for coming ZOOM meetings. For guests, kindly let Rudy know if you want to join the ZOOM invite list. Check our website or the *Bulletin* for more information. Or please e-mail Rudy directly at programs@mineralsocal.org;

(2) B J Ledyard announced a special 1-hour ZOOM presentation hosted by Pasadena City College Foundation on March 25th. The featured speaker is Denise Nelson, a past presenter with MSSC. Denise will present "The Bling We Love. Why Diamonds are Forever." PCC Foundation took BJ's suggestion of Denise Nelson as a presenter. Nice;

(3) Rudy mentions that we will share speaker lists with the PCC Foundation;

(4) Marek Chorazewicz announced a Field Trip is planned for March 20, 2021. The group will meet out at Randsburg for manganese and other minerals. Check the MSSC website for full details;

(5) Angie Guzman reports the CFMS June 2021 Lodi show has been cancelled due to COVID-19.

Program

Dr. Rossman turned the meeting over to Program Chair Rudy Lopez. Rudy introduced speaker, Dr. John Rakovan. Dr. Rakovan presents "New Insights into the Structure and Formation of Wire Silver and Wire Gold." Rudy tells us Dr. Rakovan is a professor of mineralogy at Miami University in Ohio. Rakovan has been a mineral collector for more than 50 years and it was through collecting that his eyes were opened to the science of mineralogy. Dr. Rakovan has been executive editor and contributor to Rocks & Minerals magazine since 2001, he is a fellow of the Mineralogical Society of America (MSA), a recipient of the Carnegie Mineralogical Award and has a mineral named in his honor, rakovanite, which is a decavanadate mineral.

Dr. Rakovan began his presentation with a spectacular photo of a wonderful wire silver specimen that was given as a gift in 1774 to King Louis XV of France by the King of Denmark. The piece is from Kongsberg, Norway, an area known for high purity silver mines since the late 1600's. The wire silver sits on a beautiful matrix but its crowning glory is the wire silver hoop that has grown atop – it appears delicate yet sturdy.

Rakovan continued with another Kongsberg piece. It, too, sits on a wonderful matrix. This specimen is more like a towering, intricate spire. It is 21.6 cm tall. Next he showed a showy wire silver that looks as if it could be delicate strands of hair, gently curled and as if swaying ever so slightly in an unseen breeze. There are several examples of specimen that are of a natural design; they come from Germany. Note: all of Dr. Rakovan's photography is clear and crisp, such detail is enjoyable.

Rakovan showed a native wire silver that is 11cm tall; it comes from Anhui, China. This specimen looks like a miniature tree with a slightly curved trunk line; its "branches" reaching out and up in a delicate dance with the air, barely a movement. It's quite stunning.

Rakovan's presentation moved to DIY (Do It Yourself) projects. In fact, back in 1574, there was an article published showing how to grow your own wire silver! Today, all you need is a Bunsen burner. Wire silver can even be grown in a vacuum under electric beam. The bottom line is that the growth mechanism is exactly the same, produces the same texture.

Professor Rakovan showed a photo of an "alligator with scales" (silver crystals). *[Secy Note: It looks like it could be an alligator or even a dragon – maybe even…stretch your imagination…a churro!]* The specimen is curved like a giant candy cane. On its spine are ridges, deep grooves and up close, under the microscope, it appears there are scales on the ridges *[or sugar crystals if you're thinking churro]*. Don't be fooled – this is synthetic.

From Anderson*, C.A., Mathur, R., Rakovan, J., Tremsin, A.S. (2019) A New Metal Isotope Fractionation Effect by Solid-State Ion Conduction. Geology, 47:616-620; with permission of authors.

Usually, it seems, the matrix for wire silver is acanthite, Ag_2S. Dr. Rakovan displayed several slides explaining the acanthite connection in relation to argentite and native Ag. He showed a photo of natural silver on acanthite specimen that originated from China. Another wonderful piece! It looks like the wire silver was simply, gently spun into a spool. He explained how wire gold is similar in process to wire silver. He talked about silver isotopes, diffraction, polycrystals, single crystals and ERNI, energy resolved neutron imaging. These are all fascinating topics and he displayed wonderful photos and graphs by way of explanation.

It is important to mention here that Dr. Rakovan acknowledged his collaborators including Calvin Anderson (Miami University), Raquel Alonso-Perez (Harvard University), Anton Tremsin (UC Berkley), Volker Luders (Potsdam, Germany), Ryan Mathur and other esteemed colleagues. Additionally, the GSA, Geological Society of America, Geology Journal (July 2019) features Dr. Rakovan's research and portions of today's presentation. It's on-line!

This was a fabulous presentation; a special Thank You to Dr. Rakovan, who took several questions from attendees. In fact, the Q&A was extended to after the official meeting adjournment.

To MSSC members and guests: if you missed this presentation, you missed a wonderful one, the photographs of wire silver and wire gold and, the discussion that followed. Join us next time for another informative presentation. If you are a guest, send an e-mail to Program Chair Rudy Lopez to ensure your place on the ZOOM invite list. Our speaker on April 9, 2021 will be Krista Sawchuk with "Discovering the Deep Earth."

Dr. Rossman thanked Caltech for sharing their ZOOM license with us that afforded MSSC the platform for our membership meeting. (Quick Quiz: #1 is Zinkenite, #2 is Beryllonite) Thanks to all who attended.

Adjournment was at 9:01pm.

Respectfully submitted by Angie Guzman, MSSC Secretary

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List of Upcoming MSSC Events : Mark your Calender!

Event	Date	Comments / Scheduled Program (if known)
Meeting Dates:	**ZOOM** May 14, 2021	Howard Heitner: The Tilly Foster Mine, A Classic Mineral Locality
	ZOOM June 11, 2021	Peter Goetz: - Beautiful Opal, Identification and Internet Opal
	ZOOM July 9, 2021	Eric Scerri: the Periodic Table: It's Story & in Significance
	ZOOM August 13, 2021	Krista Sawchuk: Discovering the Deep Earth
Board Meeting	April 25, 2021	Via ZOOM at 1:00 PM
Field Trip	TBA	No Field Trips Planned at this Time

Note: Dates and programs shown above are subject to change. Check your bulletins to confirm final information each month.

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SPECIAL ZOOM MEETING NOTICE By: Rudy Lopez

Effective: March 21, 2021 we deleted our ZOOM Invitation list.

MSSC members will receive an all call email each month for the meeting.

Nonmembers who wish to continue participating in future MSSC ZOOM meetings must send Rudy Lopez an email at **programs@mineralsocal.org**

Simply type "ZOOM Meeting Invitation" in the subject line to be added to the guest invitation list.

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Ride Share Listing

Can You Provide A Ride?
Would You Like Company On The Drive To Meetings?

We have heard from several of our members that they would like to ride-share with someone to the meetings. We will list the names, general location and either a phone number or an email address of anyone who would like to connect for a ride-share. If you would like to catch a ride or would like company for the trip, let me know at msscbulletin@earthlink.net and I'll put the information in this section of the bulletin. After that, any final arrangements made are up to you. Also, If you make a connection that works for you, let me know so that I can remove your information from the bulletin. The Editor

Looking for	Who	Where	Contact at
A ride	Richard Stamberg		*Meetings cancelled due to covid*

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OTHER FREE THINGS TO DO...by Ann Meister.

TheRock.show, a virtual on-line gem and mineral show will be open April 10 through April 18. New dealers, more museums to visit, a new area for events such as symposia and conferences, and much more. Come to https://therock.show/

The **Von Kármán Lecture** on Thursday, **April 15** at 7:00 PM. Available live on YouTube at Science on Ice (live public talk) - YouTube. The speaker is Alex Gardner, Glacier Scientist, JPL. The title of the presentation is **"Science on Ice: What ice says about past, Present, and future climate."** Celebrate Earth Day with us as we explore the world's ice and what it can tell us about our climate. We'll talk with scientist Alex Gardner about our cryosphere and how it affects our future.

The Watson is on Wednesday, **April 21**, at 5 PM Zoom online with a live audience Q&A at the end. At 8 PM the recorded lecture (without Q&A) will be posted on Caltech's YouTube channel https://www.youtube.com/user/caltech. You must register in advance for Zoom at Webinar Registration - Zoom. The speaker is Jonas Peters, Professor of Chemistry at Caltech. The title of the presentation is, **"Sunlight to Everything: Catalyzing a sustainable future."** Sunlight is an inexhaustible resource. Its energy is key to reducing carbon emissions, decreasing waste, and lessening CO_2 emissions. These goals are essential to mitigating the worst effects of climate change. Caltech's Resnick Sustainability Institute (RSI), led by Bren Professor of Chemistry Jonas Peters, has defined Sunlight to Everything as one of its four central research initiatives. Using sunlight, RSI researchers are imagining how to generate and manage electricity more efficiently; convert it to chemical fuels, materials, and fertilizers; and use it to power water purification. The discovery of new catalysts that can convert sunlight into desired chemical feedstocks is one of the key hurdles they face. The hunt is on, and in this lecture Peters will explain how and where he and his colleagues are looking. For online stuff at Caltech go to http://events.caltech.edu/

The **UCLA Meteorite Gallery** is temporarily closed until further notice; however the monthly lecture will be presented on Zoom on Sunday, **April 18** at 2:30 PM. Speaker and topic are not yet available.
Zoom Registration:
https://ucla.zoom.us/meeting/register/tJEqduyupj0vGd3S0_52FsbHTbPjYr0sZQUj
If you need detailed instructions on how to join a meeting via Zoom please contact our Curatorial Assistant, Juliet Hook, at jahook@ucla.edu. Note: Registration is only needed once as this is a recurring meeting in Zoom. The speaker and topic will be announced on the website. Visit the website and check on events and videos and other neat things about meteorites, go to
https://meteorites.ucla.edu

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TOURMALINE with **ALBITE**
and **QUARTZ**
Himalaya Mine,
San Diego County, CA
by Frederick C. Wilda

WEST COAST GEM & MINERAL SHOW!

Hilton Orange County/Costa Mesa!
3050 Bristol Street, Costa Mesa CA

May 7-8-9, 2021
Hours: 10-6 Fri & Sat, 10-5 Sun

80 Retail & Wholesale Dealers!

Free Admission - Parking: $10/day

Mineralshowslld@gmail.com

MSSC Advertisement Policy:
Mineral-related ads are allowable in the MSSC bulletin. Below is the price per month

Business Card	$5.00
1/3 page	$10.00
1/2 page	$20.00
Full Page	$35.00

In addition, any advertiser who purchases 12 months of space in advance will receive a discount of 12 months for the price of 10 months. The copy for the ads should be mailed to the editor at bulletin@mineralsocal.org and the payment should be sent to the
MSSC Treasurer 13781 Alderwood Lane, #22-J, Seal Beach, CA 90740

Calendar of Events:

Only local area shows are listed here. Other CFMS Club shows can be found at: http://www.cfmsinc.org/

Due to COVID-19 many clubs have cancelled or changed their show dates. CFMS updates this list if clubs notify them. If you have any questions, please reach out to the contact listed to make sure the show is still taking place.

May 7-8, 2021 Yucaipa, CA
Yucaipa Valley Gem and Mineral Society
Yucaipa Blvd and Adams St, Yucaipa, CA 92399
Friday, May 7: 6 pm to 10 pm, Saturday, May 8: noon to 10 pm
Website:http://yvgms.org

June 12-13, 2021 – Escondido CA
Palomar Gem and Mineral Club
340 N. Escondido Blvd., Escondido CA 92025
Saturday – 10 AM – 5 PM, Sunday 10 AM-4PM
Website: pgmcshow@palomargem.org

June 25, 26 & 27, 2021
CFMS 2021 Gem, M[illegible] & Jewelry Festival
Lodi Grape Fest[illegible]est Fair
413 E. Lo[illegible], Lodi, CA
Adu[illegible]nd under: Free
10A[illegible]M Fri & Sat, 10AM-4PM Sun
CANCELLED!
www.cfmsinc.org rocksbob@sbcglogal.net

August 14-15, 2021 – Arcadia CA
Pasadena Lapidary Society
Arcadia Masonic Center, 50 W. Duarte Rd., Arcadia
Hours: 10-5 Daily
Website: pasadenalapidary.org

Time for a quick Mineral Quiz.

These mineral photos were featured in a "Mineral of the Month" article sometime during my time as Bulletin Editor. (2013 to present).

irocks.com photo

1) Who am I?

$Pb_9Sb_{22}S_{42}$

Locality: San Jose Mine, Oruro City, Cercado Province Oruro Department, Bolivia
5 cm x 4.7 cm x 3.5 cm

rocks.com photo

2) Who am I?

$NaBePO_4$

Locality: Elias Lopes claim, Linópolis, Divino das Laranjeiras, Minas Gerias, Brazil
2.2 cm x 2.2 cm x 1.4 cm

Since I've provided the formula as well as the location, many of you will know immediately what this mineral is. The rest of you may need to do some research to find its name.
The answer is hidden somewhere in this Bulletin. You need to read carefully to find it. Don't peek…try to look it up first if you don't already know it.
Linda Elsnau, your Bulletin Editor

With Knowledge Comes Appreciation !

2021 MSSC Officers:

OFFICERS		
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Vice President	Ahni Dodge	vicepresident@mineralsocal.org
Secretary	Angie Guzman	secretary@mineralsocal.org
Treasurer	Carolyn Seitz	treasurer@mineralsocal.org
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2021--2022	Rudy Lopez	
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2021--2022	Leslie Ogg	
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About the Mineralogical Society of Southern California

Organized in 1931, the Mineralogical Society of Southern California, Inc. is the oldest mineralogical society in the western United States. The MSSC is a member of the California Federation of Mineralogical Societies, and is dedicated to the dissemination of general knowledge of the mineralogical and related earth sciences through the study of mineral specimens. The MSSC is a scientific non-profit organization that actively supports the geology department at Pasadena City College, Pasadena, California. Support is also given to the Los Angeles and San Bernardino County Museums of Natural History. The Bulletin of the Mineralogical Society of Southern California is the official publication of the Mineralogical Society of Southern California, Inc.

The MSSC meetings are usually held the second Friday of each month, January, February and August excepted, at 7:30 p.m. in Building E, Room 220, Pasadena City College, 1570 E Colorado Boulevard, Pasadena, California. The annual Installation Banquet is held in January, and the annual Picnic and Swap Meeting is held in August Due to PCC holidays, meetings may vary. Check the Society website for details.

The Society also sponsors the annual Pacific Micro mount Symposium held at the Fallbrook Mineral Museum during the last weekend of January.

Annual Membership dues for the MSSC are $20.00 for an individual membership, $30.00 for a family membership. Bulletins are delivered by email, there is an additional annual $20.00 fee if you prefer paper bulletins mailed to your address. The Society's contact information:

Mineralogical Society of Southern California
13781 Alderwood Lane, #22-J, Seal Beach, CA 90740
Glendale, CA 91202-1053
E-mail: *treasurer@mineralsocal.org*

Website: ***www.mineralsocal.org*** **The Mineralogical Society of California, Inc.**

MSSC Bulletin Editor

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To:

With Knowledge Comes Appreciation

Your MSSC Bulletin Is Here!